PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference WO 21.1135	**FOR FURTHER ACTION** See Form PCT/IPEA/416	
International application No. PCT/EP2005/002469	International filing date *(day/month/year)* 07.03.2005	Priority date *(day/month/year)* 16.03.2004
International Patent Classification (IPC) or national classification and IPC G01V3/26		
Applicant SERVICES PETROLIERS SCHLUMBERGER et al.		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☐ *sent to the applicant and to the International Bureau)* a total of sheets, as follows:
      ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the opinion
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
13.10.2005	09.02.2006
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Thomas, J Telephone No. +49 89 2399-

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2005/002469

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
   - ☐ international search (under Rules 12.3 and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4)
   - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

   Description, Pages

   1-29 as originally filed

   Claims, Numbers

   1-17 as originally filed

   Drawings, Sheets

   1/7-7/7 as originally filed

   ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	3-6,8,9,12-17
	No:	Claims	1,2,7,10,11
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-17
Industrial applicability (IA)	Yes:	Claims	1-17
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Cited documents:

Reference is made to the following documents:

D1: ZHENYA ZHU ET AL.: 'Experimental studies of electrokinetic conversions in fluid-saturated borehole models' GEOPHYSICS, vol. 64, no. 5, September 1999 (1999-09), pages 1349-1356, XP002288589

D2: US 2003/038634 A1

D3: FR-A-2 836 557

D4: US-A-5 841 280

Lack of novelty (Art. 33(1,2) PCT)

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claims 1, 2, 7, 10 and 11** is not new in the sense of Article 33(2) PCT.

The subject-matter defined in the independent **claim 1** is anticipated by D1 for the following reasons:

The document discusses excessively the possibilities of a new borehole logging technique wherein electroseismic and seismoelectric borehole measurements are used in order to determine formation parameters. This document cites in particular in the last sentence of the abstract and the whole paragraph "Conclusions" the determination of formation parameters using electroseismic and seismoelectric measurements in combination. As a consequence, the subject-matter defined in the independent claim 1 is anticipated by this document.

The additional features defined in the dependent **claims 2, 7, 10 and 11** are also anticipated by D1, lacking therefore novelty contrary to the requirements of Art. 33(1,2) PCT:

Claim 2: p. 1350, right hand column, description of Fig. 1; p. 1354, left hand column, last

paragraph.
Claims 7, 10 and 11: p. 1350, left hand column, 3rd and 4th paragraph.

Lack of inventive step (Art. 33(1,3) PCT

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claims 3-6, 8, 9 and 12-17** does not involve an inventive step in the sense of Article 33(3) PCT.

The subject-matter defined in the independent apparatus **claim 12** is not inventive for the following reasons:
D2, which is considered as the closest prior art for the subject-matter defined in claim 12, shows a logging tool comprising EM transmitter and receiver coils (33, 35, 48, 50), electrode assemblies (44-46), a seismic sensor (56) and surface acquisition and processing means (24, 54).
Hence, the logging tool known from D2 differs from the one defined in claim 12 only by the fact, that the source is not integrated in the logging tool, but installed at the earth's surface. In order to apply the combination of electroseismic and seismoelectric methods as cited in D1, it would be obvious for the skilled man to include a seismic source in the logging tool shown in D2, similarly to the well-known logging tool used for seismoelectric logging. An example therefor is shown in D3 (p. 12, l. 1-12). Hence, no inventive step can be seen to the subject-matter defined in the independent apparatus claim 12, contrary to the requirements of Art. 33(1,3) PCT.

All additional features defined in **claims 13-17** are anticipated by D2, which renders the subject-matter defined in claims 13-17 also not inventive in view of the teachings from D1 and D2 in combination with D3.

The additional features defined in the method claims 3-5, 8 and 9 are also not inventive (Art. 33(1,3) PCT). The reasons are detailed in the following:
Claim 3: The additional features are obvious in view of the teachings of D1 in combination with D4. D4 shows the combination of acoustic and seismoelectric measurements in order to derive additional information about the surrounding formation. On the basis of these

teachings it is obvious for the skilled man to use not only the converted seismoelectric or electroseismic wave measurements but also the non-converted measurements, as it is done in D4 with the acoustic waves. Hence, claim 3 can not provide an inventive contribution over the prior art.

Claims 4 -6: The inversion technique shown in D4 (claim 1; abstract l. 10-17; c. 2, l. 23-42), wherein a subsurface model of the surrounding formation is derived using an inversion technique wherein the synthesized data is optimized with respect to the measured data. In D4, the non-converted acoustic wave is also considered in the inversion technique. These teachings can be directly applied to the data measured in D1, in order to obtain an optimized subsurface model. In addition, D4 cites the electrokinetic coupling coefficient and the mobility (c. 5, l. 3-20; c. 6, l. 2-3) as important parameters for the electrokinetic mechanism. The teachings concerning the electrokinetic coupling coefficient and the mobility are also shown and discussed in D3 (p. 5, l. 3-22).

Claims 8 and 9: The use of seismomagnetic or magnetoseismic signals is discussed in D3 (p. 4, l. 15-29), these features can therefor not provide an inventive contribution over the prior art.